ExxonMobil
Environmental Services Company
3225 Gallows Road
8B-1921
Fairfax, VA 22037

Steven P. Anastos
Project Manager

July 29, 2013

Via Email and UPS Overnight

Keith Olinger, SFD-7-5
United States Environmental Protection Agency, Region IX
Superfund Division
75 Hawthorne Street
San Francisco, CA 94105
415-972-3125

Re: Omega Chemical Corporation Superfund Site
U.S. EPA Supplemental Request for Information

Dear Mr. Olinger:

Exxon Mobil Corporation (hereafter "ExxonMobil") strongly objects to the three additional requests for information ((Mobil Exploration & Producing U.S. Inc (May 16, 2013); ExxonMobil Environmental Services Company (May 16, 2013); and ExxonMobil Foundation (May 20, 2013)) related to the Omega Chemical Superfund Site ("Omega" or the Site"). As you know, in 2005 ExxonMobil participated in a deminimis settlement with the US Environmental Protection Agency (EPA) for the referenced Site which included releases from the Site.

Additional information was requested by the EPA in three separate 104(e) requests for information dated July 2011, August 2012 and January 2013 for information related to specific properties located hydraulically down-gradient from the Site, specifically 10607 and 10629 Norwalk Boulevard and 10623 and 10628 Fulton Avenue, Santa Fe Springs, CA (the "Property"). In October 2011, October 2012 and February 2013, ExxonMobil responded to those requests, respectively, with all available and relevant information.

Notwithstanding, this letter and its attachments constitute the response of ExxonMobil to the May 2013 Section 104(e) information request (the "Request") that EPA sent to ExxonMobil Environmental Services Company in connection with the Site. That Request was received by ExxonMobil in May 2013. Thank you for extending the due date for this submittal until July 29, 2013.

GENERAL OBJECTIONS

This Request is overly broad and unduly burdensome and seeks information that is irrelevant and not calculated to lead to information that can legally be obtained under Section 104(e) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and therefore exceeds EPA's statutory authority under CERCLA. Section 104(e) of CERCLA grants "[a]ny officer, employee, or representative of the President, duly designated by the President..." the right to seek information under Section 104 (e)(2) through (4) of CERCLA. EPA has been designated by the President. Section 104 (e)(2) allows EPA to seek the following information:

A. The identification, nature, and quantity of materials which have been or are generated, treated, stored, or disposed of at a vessel or facility or transported to a vessel or facility.
B. The nature or extent of a release or threatened release of a hazardous substance or pollutant or contaminant at or from a vessel or facility.
C. Information relating to the ability of a person to pay for or to perform a cleanup.

EPA may also enter "[a]ny vessel, facility or establishment, or other place or property...." and take samples. 42 U.S.C. § 9604(e)(3). Similarly, EPA may inspect such locations and take samples. However, Section 104(e)(1) indicates that EPA's authority under 104(e) "may be exercised only for the purposes of determining the need for response, or choosing or taking any response action under this subchapter, or otherwise enforcing the provisions of this subchapter." 42 U.S.C. § 9604(e)(1).

Thus, while EPA may require the submission of relevant information for the appropriate purposes, its authority is not unlimited. Even EPA's enforcement rights are limited. EPA may ask the Attorney General to commence a civil action to compel compliance with a 104(e) request, but, by statute, the court can only direct compliance with a 104(e) request if "there is a reasonable basis to believe there may be a release or threat of a release of a hazardous substance." 42 U.S.C. § 9604(e)(5)(B). Even then, it cannot do so if "under the circumstances of the case the demand for information or documents is arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law." 42 U.S.C. § 9604(e).

ExxonMobil, as set forth in the following pages and the attachments hereto, is providing to EPA the information readily available to ExxonMobil. Moreover, ExxonMobil is willing to provide any additional specific information requested by EPA in compliance with CERCLA to the extent that it is relevant and reasonably available. However, both ExxonMobil's response and any future information it may provide are subject to the following objections (hereafter the "General Objections"):

1. ExxonMobil objects to the Request to the extent that it seeks information beyond what is authorized by Section 104(e).
2. ExxonMobil asserts all applicable privileges and protections it has with regard to EPA's enumerated inquiries including the attorney-client privilege, the attorney work product doctrine, and materials generated in anticipation of litigation, and has attempted to exclude such materials from this response. As a result of providing any of the documents or information included in its response to EPA's request, ExxonMobil does not waive any privilege, including attorney work product protection, that may apply to any documents or information concerning the same subject matter which are privileged, confidential or subject to attorney work product protection. In addition, ExxonMobil asserts all applicable privileges for materials which are proprietary, company confidential, or trade secret.

3. ExxonMobil objects to any requirement to produce documents or information already in the possession of a governmental agency, documents available through the public domain, documents previously provided to EPA or general industry practices. Such requirement is duplicative and, therefore, unnecessary and burdensome.
4. ExxonMobil disavows any obligation to supplement these responses on an ongoing basis. CERCLA Section 104(e)(2) authorizes EPA to require submission of information upon reasonable notice. ExxonMobil has previously provided all relevant information to EPA within ExxonMobil's October 2011, October 2012 and February 2013 104(e) responses. Notwithstanding the foregoing, if more information is desired, ExxonMobil is willing to provide additional information if specifically requested by EPA in the future and in compliance with CERCLA provided that the information is relevant, reasonably available, has not already been provided, and is not otherwise subject to these objections.
5. Under CERCLA Section 101(14), the term "hazardous substance" is defined to exclude petroleum, including crude oil or fractions thereof. ExxonMobil has not discovered any evidence that it generated, treated, stored or disposed of materials other than petroleum at the Property.

Notwithstanding and without waiving these objections, and subject to them, ExxonMobil hasprepared this response based upon the information available to it. Where questions or definitions are vague, ambiguous, overly broad, unduly burdensome, or beyond the scope of EPA's authority pursuant to Section 104(e) of CERCLA, ExxonMobil is making appropriate andreasonable efforts to provide responsive information based on ExxonMobil's interpretation of the Request. To the extent that information submitted herein is not required by law or is otherwise outside the scope of EPA's 104(e) authority, that information is voluntarily submitted. ExxonMobil waives no rights or protection of information it voluntarily submits.

RESPONSES

Subject to the foregoing, ExxonMobil provides the following responses:

1. **State the full legal name, address, telephone number, positions(s) held by, and tenure of, the individual(s) answering any of these questions on behalf of ExxonMobil Environmental Services Company ("EMES") concerning the property and facility or facilities formerly located at 10607 Norwalk Boulevard, Santa Fe Springs, California and/or the addresses identified in this Question Number 1 (the "Property"). For purposes of this Request for Information, in addition to 10607 Norwalk Boulevard, the Property also includes the parcels designated with current Assessor's Parcel Numbers 8009-025-067, 8009-025-069, and 8009-025-070 and/or former Assessor's Parcel Number 8009-025-008. EPA information indicates that ExxonMobil Oil Corporation owned and operated on property with the following current street addresses: 10623 Fulton Wells Avenue, Santa Fe Springs, CA; 10628 Fulton Wells Avenue, Santa Fe Springs, CA; and 10629 Norwalk, Santa Fe Springs, CA**.

Ramon Echevarria
Exxon Mobil Corporation
800 Bell Street
Houston, TX 77002-7497
Office: (713) 656-4486

Steven P. Anastos
ExxonMobil Environmental Services Company
3225 Gallows Road
Fairfax, VA 22037
Office: (703) 846-3393

2. Describe the corporate affiliation between EMES and ExxonMobil Corporation. Provide copies of all documentation evidencing such affiliation.

ExxonMobil Global Services Company is a wholly-owned subsidiary of Exxon Mobil Corporation, and ExxonMobil Environmental Services Company (EMES) is a wholly-owned subsidiary of ExxonMobil Global Servises Company. EMES was incorporated on July 20, 2007. See Attachment EMOMG 00981.

3. Describe how EMES became involved with the Property, whether it was on behalf of ExxonMobil or an affiliated entity, the dates of its involvement, and what type of operations it conducted at the Property (i.e., oil production-related activities, remediation, etc.).

EMES is a service organization to Exxon Mobil Corporation and provides environmental services to the entire corporation. EMES became involved with the Property at the time of it's incorporation in 2007.

4. State whether EMES is a current or prior owner or operator of any wells, piping, tanks, or any other type of equipment located at the Property. If so, for the entire period that you owned and/or operated at the Property or any portion thereof, provide the dates of ownership and/or operation, and the type of operations that occurred. As part of your response, provide copies of environmental documents, leases, rental agreements, access agreements, or other agreements made with parties associated with these operations.

ExxonMobil requested clarification on this question from the EPA, Mr. Keith Olinger. Specifically, ExxonMobil inquired as to whether "any wells" referenced in the question referred to production wells or monitoring wells. EPA indicated that "any wells" referred to oil production wells. EMES is not and was never an owner of any production wells or associated piping and tanks on the Property.

5. Identify all individuals or entities known to have operated at the Property or any portion thereof, including the operation of any wells, piping, tanks, or any other type of equipment located at the Property. As part of your response, include any information known regarding solvents and any other chemicals or substances used and wastes generated in these operations.

See response #2 in ExxonMobil's 104(e) response dated February 26, 2013. Besides ExxonMobil, other operators known to have operated at the Site include the Hathaway Company and the Pyramid Oil Company.

ExxonMobil has made an extensive search of historical records but did not locate any responsive documents or information related to any solvents, hazardous chemicals or products used in operations.

Relative to waste generation on the property, during May 1994, soil treatment was initiated in two bioremediation cells on the Site. Soil in the bioremediation cells was derived from properties in the Mobil operated Santa Fe Springs Oil Field including Jalk Fee (720 yd^3), DeWenter/Jordan/Green (23,000 yd^3), Baker/Humble (8,950 yd^3) and Oil Well 732-C (1,600 yd^3). During December 1995, closure confirmation soil samples were collected from the cells. Closure of the bioremediation cells was received from the Regional Water Quality Control Board, Los Angeles Region in a letter dated April 9, 1997. A copy of the closure letter (Attachment EMOMG 00983) and a portion of the Third Quarter 1994 Monitoring Report for Land Treatment (EMOMG 00961 – 00979) are attached for you review.

6. Have you ever used, manufactured, produced, or generated any hazardous substances, materials or waste in the operations at the Property? If your answer is anything other than an unqualified "no" for the entire period since you operated at or owned any equipment at the Property or any portion thereof, provide a complete description of such use, manufacture, production or generation of all such substances, materials and wastes, including the following:

a. The trade or brand name, chemical composition, and quantity used for each chemical or hazardous substance, and the relevant Material Safety Data Sheet for each product, and its period of use;

b. A description of the process in which the hazardous substance is or was stored, used, manufactured, generated or produced (including any current or discontinued processes);

c. The location(s) where each chemical or hazardous substance is or was used, stored and disposed of. In addition, identify the kinds of wastes (e.g., hazardous materials, spent solutions, tank bottoms, scrap metal, solvents, waste water), quantities and methods of disposal for each chemical or hazardous substance;

d. A description of the waste streams from any process in which any such hazardous substance is or was used, manufactured, generated, or produced;

e. Copies of any permits for storage, treatment, or disposal of any waste stream from any process in which any hazardous substance is or was used, manufactured, generated, or produced; and

f. **Copies of all manifests governing hazardous substances generated by your operations at the Property.**

ExxonMobil has made an extensive search of historical records and has not located any responsive documents or information related to any hazardous chemicals, substances, or products used at the Property.

7. During EMES's involvement with the Property, describe what other activities and operations have been known to have been conducted at the Property or any portion thereof. As part of your response, include any information known regarding solvents and any other chemicals or substances used and wastes generated in these operations.

Since 2007, the year of EMES' incorporation, EMES-related activities have included groundwater sampling, monitoring well and soil vapor well installation and sampling, drilling of borings, and implementation of a routine groundwater sampling schedule. The Property is currently an industrial park with multiple buildings and tenants. The site is approximately 95% paved or developed with structures.

ExxonMobil has made an extensive search of historical records and has not located any documents or information related to any hazardous chemicals, substances, or products used at the Property during the oil field operations.

8. Provide detailed information on the tanks and piping previously located in the southeastern portion of the Property. EPA information obtained from a 1991 subsurface soil investigation report prepared by Levine-Fricke for Mobil Exploration & Producing U.S. Inc. indicates that there were aboveground tanks in this part of the Property beginning in 1927. As part of your response, include the following information:

a. Figure(s) showing tank and piping locations;

b. Contents of the tanks; and

c. **Ownership of the tanks and piping.**

ExxonMobil's initial 104(e) response for the Property dated October 24, 2011 included historical aerial photographs that indicated the presence of above ground storage tanks (ASTs) in the southeastern portion of the site. No other information related to the ASTs was identified in our records search.

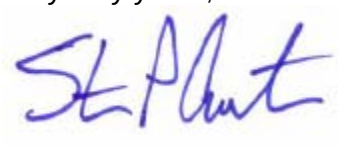
ExxonMobil has made an extensive search of historical records but did not locate any responsive documents, figures or information related to ASTs or piping in the southeastern portion of the site, the contents of the tanks, or the ownership of the tanks.

CLOSING STATEMENT

ExxonMobil has not operated at the Property in more than 50 years. No documentation has been located indicating that any spills of hazardous chemicals, substances, or products have occurred at the Property during ExxonMobil's operational period. If spills of hazardous chemicals, substances, or products had occurred at the Property during the ExxonMobil operating period, these spills would likely have attenuated over the past 50 years. Considering that ExxonMobil has previously participated in a deminimis settlement, including releases, ExxonMobil will vigorously oppose any further participation in the Omega remediation.

Please address further correspondence to our counsel, Ramon Echevarria whose address and telephone are included in response number 1.

Very truly yours,



Steven P. Anastos, P.G.
Project Manager
ExxonMobil Environmental Services Company

Pc: R. Echevarria, Exxon Mobil Corporation

CERTIFICATION

I, S. Kishinevsky, the Secretary of **EXXONMOBIL GLOBAL SERVICES COMPANY**, a corporation organized and existing under the laws of the state of Delaware, United States of America,

DO HEREBY CERTIFY:

1. That EXXONMOBIL GLOBAL SERVICES COMPANY is a wholly-owned subsidiary of EXXON MOBIL CORPORATION.
2. That EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY is a wholly-owned subsidiary of EXXONMOBIL GLOBAL SERVICES COMPANY.

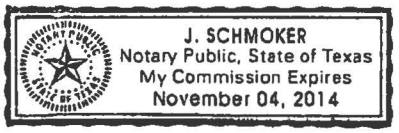
IN WITNESS WHEREOF, I have executed this Certification and affixed the seal of ExxonMobil Global Services Company hereto in the city of Houston, Texas on the 19th day of July, 2013.

EXXONMOBIL GLOBAL SERVICES COMPANY

By S. Kishinevsky
S. Kishinevsky, Secretary

STATE OF TEXAS §
COUNTY OF HARRIS § SS:
UNITED STATES OF AMERICA §

Sworn to and subscribed before me on this the 19th day of July, 2013.



Notary Public, State of Texas

Cal/EPA

Los Angeles
Regional Water
Quality Control
Board

101 Centre Plaza Drive
Monterey Park, CA
91754-2156
213) 266-7500
FAX (213) 266-7600

Pete Wilson
Governor

April 9, 1997

Everett Ferguson Jr.
Senior Associate Geoscientist
McLaren Hart Environmental
16755 Non Karman Avenue
Irvine, CA 92714

CLOSURE OF PETROLEUM HYDROCARBON ISSUES AT MOBIL JALK FEE PROPERTY LOCATED AT 10607 NORWALK BLVD, SANTA FE SPRINGS (FILE NO. 90-60-47(94))

We have reviewed the final completion report, dated September 20, 1996, and your April 1997, letter which requested closure of the Land Treatment Unit at the above referenced site.

Approximately 34,000 cubic yards of hydrocarbon contaminated soil from the subject site have been treated and discharged in accordance with the requirements of Board Order No. 90-148. Analytical data have been submitted to the Board in accordance with Section IV, Specific Report Requirements of the Monitoring and Reporting Program No. 90-148-47, documenting compliance.

Based upon this data, we conclude that the requirements set forth in Order No. 90-148 have been complied with and no further action is required for the soil treatment at the site.

If you have any question, please contact Manjulika Chakrabarti at (213) 266-7610.

J.E. Ross, Unit Chief
Site Cleanup Unit

cc: L. A. County Environmental Health Department

Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.

Third Quarter 1994 (July-September) Monitoring Report for Land Treatment

McLaren/Hart Project No. 03.0601266.000

Mobil Jalk Fee, Santa Fe Springs, California CRWQCB Monitoring and Reporting Program No. 90-148-47 [File No. 90-60-47(94)]

October 15, 1994

Prepared for: **Mobil Exploration**
10735 South Shoemaker Avenue
Santa Fe Springs, California 90670
Client City, State, and Zip

Prepared by: **McLaren/Hart Environmental Engineering Corporation**
16755 Von Karman Avenue
Irvine, California 92714-4918

This project was completed under the direction of a California Registered Geologist.

Tabb W. Bubier
Supervising Geoscientist

Hassan Amini, Ph.D., R.G.
Principal Geoscientist

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FIGURES

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APPENDICES

1.0 INTRODUCTION

This report presents the results of McLaren/Hart's third quarter 1994 (July-September) land treatment cell monitoring at the Mobil Exploration & Producing U.S., Inc. (Mobil) Jalk Fee site in Santa Fe Springs, California. This report has been prepared in accordance with the requirements set forth in California Regional Water Quality Control Board-Los Angeles Region (CRWQCB) Monitoring and Reporting Program No. 90-148-47. The scope of work for this project was presented in McLaren/Hart's remedial action plan (RAP) dated December 21, 1993, and approved by the CRWQCB.

The principal objective of the land treatment program is to reduce the concentration of total recoverable petroleum hydrocarbons (TRPH) in soil transported to the land treatment cells to below 1,000 parts per million (ppm). As presented in the RAP, the soil transported to the Jalk Fee site is derived solely from properties in the Mobil Operated Santa Fe Springs Oil Field, including the Jalk Fee, DeWenter/Jordan/Green, Baker/Humble properties and Oil Well 732-C site (Figure 1). To date, two bioremediation cells (Cell #1 [large cell] and Cell #2 [small cell]) have been constructed, surveyed, and loaded with TRPH-impacted soil, three groundwater monitoring wells have been installed and sampled, and baseline soil sampling as presented in our RAP has been completed. All soil excavation activities have been completed and soil treatment was started in early May 1994. This third quarter 1994 (July-September) report presents the bioremediation cell operation, maintenance, and monitoring results from July 1994 through September 1994. Figure 2 presents the site layout.

2.0 BASELINE SAMPLING AT BIOREMEDIATION CELL

A total of 20 baseline soil samples were obtained on March 9, 1994, from the base of the treatment cells after construction of the cells and prior to loading soil into the cells. Samples were randomly selected using a random number generating routine in a programmable calculator from the grid system presented in Figures 3 and 4. The same grid was used for soil sampling of the treatment cells during bioremediation at the Jalk Fee. The soil samples were collected using a hand auger and drive sampler at approximately one-inch below ground surface to document baseline petroleum hydrocarbon concentrations underlying the treatment cells. The soil samples were analyzed for total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1 and benzene, toluene, xylenes, and ethylbenzene (BTXE) by EPA Method 8020. The analytical results from these soil samples will be compared with the results for soil samples obtained at the completion of treatment from the same sampling locations and depths to document that the treated soil did not impact the native soil underlying the treatment cell. Soil sampling protocols are presented in Appendix A.

Baseline sampling analytical results indicate petroleum hydrocarbons were present before soil was loaded into the cells. Most grid cells sampled in Cell #1 contained TRPH levels below 1,000 ppm with the exception of grid cell number 40 (which was non-detect). Grid cell numbers 4, 21, and 30 had petroleum hydrocarbon levels greater than 1,000 ppm (10,000 ppm, 1,100 ppm, and 4,300 ppm, respectively). The average TRPH concentration of the samples collected from Cell #1 was 1,317 ppm.

Most grid cells sampled in Cell #2 contained some amounts of petroleum hydrocarbons with the exception of grid cell number 80 (which was non-detect). All grid cells sampled in Cell #2, however, had TRPH levels less than 1,000 ppm. The highest TRPH level in Cell #2 was detected in grid cell number 57 at 800 ppm.

The average TRPH concentration of the samples collected from Cell #2 was 427 ppm. All samples from Cells #1 and #2 were also analyzed for BTXE. All samples were below the reporting limit of 10 parts per billion (ppb). Analytical results of baseline sampling are presented in Table 1. Soil sample analytical results and chain-of-custody forms are presented in Appendix B.

3.0 SOIL EXCAVATION AND CONFIRMATORY SAMPLING

Soil excavation activities were completed at the Jalk Fee, DeWenter/Jordan/Green, Baker/Humble, and Mobil Oil Well 732-C sites. The volume of soil from each location containing TRPH above 1,000 parts per million includes:

Location	Volume	Dates
Jalk Fee	720 cubic yards	March 10 and 16, 1994
DeWenter/Jordan/Green	23,000 cubic yards	March 14 and May 5, 1994
Baker/Humble	8,950 cubic yards	May 6 and June 3, 1994
Mobil Oil Well 732-C	1,600 cubic yards	May 11 and July 25, 1994

Soil excavated from the properties was loaded into end-dump trucks and transported to the bioremediation cells. To date, the soil has been spread evenly into three 18-inch lifts at cell #1 (Figure 3, large cell) and two 18-inch lifts at cell #2 (Figure 4, small cell). The estimated total volume of soil in the two cells is currently approximately 34,600 cubic yards.

As part of the excavation and confirmatory sampling program, soil samples were obtained from the base and sidewalls of the excavations at each of the properties to verify that all soil containing TRPH above 1,000 ppm was removed. All soil samples were analyzed for TRPH by EPA Method 418.1 and selected soil samples were analyzed for BTXE by EPA Method 8020. All analyses were conducted by a California EPA hazardous waste certified mobile analytical laboratory. The results of these sampling programs have been documented and reported to the RWQCB.

Prior to excavation, the properties were cleared and grubbed. All metal piping, concrete blocks, and other oversized material greater than approximately six inches in diameter were segregated from

contaminated soil and clean overburden soil both before and after transport to the Jalk Fee site. Clean overburden soil was stockpiled separately and was used to backfill the Jalk Fee and Baker/Humble properties. The DeWenter/Jordan/Green property and the Santa Fe Springs Oil Well 732C site will be backfilled with remediated soil from the two cells. The locations of the excavations were measured relative to the site boundaries using a measuring wheel and recorded in a field notebook.

4.0 GROUNDWATER MONITOR WELL SAMPLING

Three groundwater monitor wells were installed at the Jalk Fee between January 19 and 21, 1994, in accordance with the RWQCB-Los Angeles Region Waste Discharge Requirements (WDR) permit for the project (Figure 2). The wells consist of one upgradient monitor well (MMW-3) and two downgradient monitor wells (MMW-4 and MMW-5). Two wells (MMW-1 and MMW-2) not associated with the Jalk Fee site, were installed on January 19 and 20, 1994, respectively. MMW-1 is located on the Mobil DeWenter/Jordan/Green property and MMW-2 is located at the Mobil Baker/Humble property (Figure 6 and 7, respectively). Both wells were installed to determine whether past oil production activities have impacted groundwater beneath the sites. All five wells were sounded, developed, and sampled on September 16, 1994, respectively. The results from the groundwater level sounding indicated that groundwater in the aquifer underlying the property (the Exposition Aquifer) flows to the southwest at a hydraulic gradient of 0.007 feet/foot as shown in Figure 5. Table 2 provides the groundwater monitor well construction details.

5.0 GROUNDWATER ANALYTICAL RESULTS

The groundwater samples obtained from the five wells were sampled for TRPH by EPA Method 8015 modified and volatile organic compounds (VOCs) by EPA Method 624. The three wells from the Jalk Fee site were also sampled for pH by EPA Method 150.1, and total dissolved solids (TDS) by EPA Method 160.1. Tables 3 and 4 present the positive groundwater sample analytical results from the first, second, and third quarter sampling events for the Jalk Fee site.

TRPH was not detected in the three wells at the Jalk Fee site. Groundwater pH levels ranged from 6.9 to 7.1 and TDS concentrations ranged from 1,200 to 1,700 ppm. Trichloroethene (TCE) and 1,1-dichloroethene (1,1-DCE) concentrations in all three wells remained relatively unchanged from the second quarter. 1,1-DCE was detected at 3 ppm (first quarter), <5 ppm (second quarter) and <5 (third quarter), respectively. TCE decreased in each well from 24 to 12 ppb, 16 to 6 ppb, and 100 to 82 ppb, respectively from last quarter. Toluene was detected in MMW-3 only, at a concentration of 3 ppb. Tetrachloroethene (PCE) was detected in MMW-5 only, and decreased from 930 ppb from last quarter to a concentration of 830 ppb. Total xylenes were detected in MMW-3 at 6 ppb. In well MMW-5, methylene chloride was detected at 23 ppb. No other VOCs were detected.

TRPH was not detected in either of the wells at the DeWenter/Jordan/Green (MMW-1) or Baker/Humble (MMW-2) site. Groundwater pH levels were detected at 7 and 6, respectively. TDS concentrations were detected at 1,100 and 1,900 ppm, respectively. 1,1-DCE was detected in MMW-2 at a concentration of 110 ppb. TCE concentrations were detected in well MMW-1 at 11 ppb. PCE was detected in MMW-1 at 5 ppb. Vinyl chloride, 1,2-Dichloroethane, and benzene were detected in MMW-2 at concentrations of 33 ppb, 2 ppb, and 57 ppb, respectively. No other VOCs were detected in either well.

The groundwater sampling protocols are presented in Appendix A. The groundwater sample analytical results and chain-of-custody forms are presented in Appendix C.

6.0 BIOREMEDIATION CELL OPERATION AND MAINTENANCE

Operation and maintenance of the treatment cells included weekly visual inspections of the bioremediation cells, tilling (stabilization) of the soil piles and watering using a mobile water truck, and addition and mixing of nutrients. The soil was tilled weekly using an SS250 soil stabilizer. The stabilizer pulverized and thoroughly mixed the soil to promote aeration, the mixing of nutrients, and biodegradation. Nutrients were added to the soil on a weekly basis and thoroughly mixed using the soil stabilizer. Downslope storm water runoff collection trenches were inspected weekly to determine whether storm water runoff had ponded and whether breeches in the earthen berm retaining walls had occurred. During the July - September quarter, there was no evidence of surface water or breaches in the earthen berm.

A standard mixture of agricultural nutrients consisting of water-soluble ammonium sulphate ($N_2H_4(_2SO_4)$) and ammonium phosphate ($NH_4(_2HPO_4)$) was added weekly to each bioremediation cell. Five hundred pounds of ammonium sulphate were added weekly to the 3.17 acre Cell #1, and 250 pounds of ammonium sulphate were added weekly to the 1.30 acre Cell #2. Phosphorous levels were sufficient from the last quarter. Therefore, ammonium phosphate was not added during this quarter to either of the cells. A total of 750 pounds ammonium sulphate was added weekly for the two cells combined. The ammonium sulphate fertilizer contains 21 percent nitrogener. Based on these nitrogen percentages, a total of 105.0 pounds of nitrogen was placed in Cell #1 on a weekly basis, and 52.5 pounds of nitrogen was placed in Cell #2 on weekly basis; a total of 157.5 pounds of nitrogen were added to the two cells combined on a weekly basis.

7.0 BIOREMEDIATION CELL SAMPLING

Soil samples were collected weekly from each of the two bioremediation cells and analyzed for the constituents required in the RWQCB-Los Angeles Region WDR permit. Sample grid cell locations within Cell #1 and Cell #2 were randomly selected using a random number generating routine in a programmable calculator. One grid cell location from each bioremediation cell was analyzed every week for various "bioparameters". The "bioparameters" analysis analyzed the following: pH, ammonium nitrogen, nitrate nitrogen, orthophosphate, moisture content, hydrogen oxidizing microbial population, and total heterotrophic microbial population.

During July 7 through August 25, 1994, a total of 6 to 7 randomly selected grid cell locations from Cell #1 and 3 to 4 locations from Cell #2 were sampled every two weeks and analyzed for TRPH by EPA Method 418.1 in accordance with the WDR permit. Beginning September 1, sampling was completed for the first 18-inch layer of Cell #2, at which time, the number of sampling locations for TRPH for Cell #1 increased to 10. Two randomly selected grid cell locations from Cell #1 and Cell #2 were sampled once a month from each cell and analyzed for total organic carbon (TOC) by EPA Method 150.1. The objective of the sampling is to monitor the effectiveness of biological treatment and to identify the parameters that affect the rate of biodegradation. The sampling data is used to optimize the performance of the biological treatment at the site.

In accordance with the WDR permit, soil samples were analyzed quarterly for VOCs and semi-volatile organic compounds (SVOCs) by EPA Methods 8020 and 8270 and organic lead by EPA Method 6010/7000. The composite samples for these analyses were from four randomly selected grid cells. All laboratory analytical Quality Assurance/Quality Control protocols for the soil sampling and analyses will be completed in accordance with our RAP.

8.0 BIOREMEDIATION CELL SOIL SAMPLING ANALYTICAL RESULTS

LARGE CELL (#1)

Monitoring of TRPH, nutrient, moisture, and microbial plate counts at the large bioremediation cell was initiated on June 9, 1994. This third quarter report includes the analytical results for the soil samples collected from July 7 to September 22, 1994 (a 70 day period). The average TRPH level decreased from a high of 1,885 ppm to 618 ppm, then increased to 967 ppm. This apparent increase in TRPH levels could be attributed to the fact that one of the samples collected during the last sampling round was collected from a "TRPH hot spot" (3200 ppm TRPH). Soil pH levels varied within a narrow range of 7.3 to 8.7. Moisture levels ranged from 5.2% to 15.9%, averaging 9.14%. Total nitrogen and phosphorous levels fluctuated throughout the quarter. The cell's microbial population fluctuated throughout the period. This data indicates that an initial adjustment period was required for the microbes to metabolize the increased nutrient and moisture levels before the microorganisms could effectively begin regenerating in number and breaking down the hydrocarbons. It is also not uncommon for there to be an apparent increase in the TRPH levels due to the production of surfactants by the microorganisms.

As required for each quarterly sampling by the California Regional Water Quality Control Board, four samples were collected and composited into one sample and analyzed for EPA Methods 8020 (VOCs), 8270 (SVOCs), and 6010/7000 (CAM Metals). VOCs and SVOCs were not detected in the sample. Lead was detected at 11 ppm which is below CAM Title 22 Total Threshold Limit Concentration (TTLC) of 50 ppm and 10 times the Soluble Threshold Limit Concentrations (STLCs).

The analytical results for TRPH is presented in Table 6. The analytical results for pH, nitrogen, phosphorous, moisture content, and microorganism plate counts are presented in Table 7. Graphs of TRPH and total heterotrophic plate counts versus time, total nitrogen and orthophosphate versus time, and moisture content versus time are presented in Figures 8, 9, and 10, respectively.

SMALL CELL (#2)

Monitoring of TRPH, nutrient, moisture, and bioparameter levels of the small bioremediation cell was initiated on May 4, 1994. This third quarter report includes the analytical results for the soil samples collected from July 7 to September 22, 1994 (a 70 day period). It appears that the average TRPH levels decreased from 780 ppm to 490 ppm, but increased to 803 ppm during the last 7 days. This apparent increase in average TRPH levels is attributed to the fact that one of the samples collected during the last sampling round was collected from a previously unsampled "TRPH hot spot" (1,500 ppm TRPH). In addition, the increase in the TRPH levels can be partially attributed to the production of surfactants by the microorganisms, which the microorganisms produce to increase the solubility of the organic compounds. The pH levels ranged from 7.6 to 8.1. Moisture levels ranged from 5.8% to 11%, averaging 7.57%. Total nitrogen and phosphorous levels fluctuated throughout the 70 day period. The cell's microbial population fluctuated throughout the period.

VOCs and SVOCs were not detected in the sample. Lead was detected at 13 ppm which is below CAM Title 22 Total Threshold Limit Concentration (TTLC) of 50 ppm and 10 times the Soluble Threshold Limit Concentrations (STLCs).

The TRPH analytical results and the pH, nutrient, moisture content, and microorganism plate count analytical results are presented in Tables 8 and 9, respectively. Graphs of TRPH and total heterotrophic plate counts versus time, total nitrogen and orthophosphate versus time, and moisture content versus time are presented in Figures 11, 12, and 13, respectively.

9.0 CONCLUSIONS

Based on field observations and analytical results from the first and second quarters, the following conclusions have been made:

(1) Suitable conditions for soil bioremediation have been achieved during the past quarter in each of the bioremediation cells. Soil pH levels are within an acceptable range for bioremediation and well developed hydrocarbon oxidizers and total heterotrophic microbial populations have been established at both bioremediation cells.

(2) Once the microbial population became established at both of the bioremediation cells significant reductions in TRPH concentrations were achieved. All grid cells in Cell #2 have been sampled and average below 1,000 ppm. Removal of the first 18-inches of soil has been verbally approved by Manju Venkatanarayana of the California Regional Water Quality Control Board. Written approval from the RWQCB is expected in the near future.

(3) Groundwater analytical results for the Jalk Fee site indicate that VOC concentrations have decreased since the last sampling round. The groundwater analytical results indicate that PCE contamination is migrating onto the site.

(4) Groundwater analytical results for the Baker/Humble site indicate that 1,1-DCE, and benzene contamination is detected in the groundwater at concentrations of 110 ppb and 57 ppb, respectively.

10.0 CLOSURE

Based on the results of this investigation, the following work is recommended:

(1) The average TRPH levels for the first lift of Cell #1 is below 1,000 ppm, although the last set of samples showed an increase from 618 ppm to 967 ppm. Confirm average TRPH levels are below 1,000 ppm and with RWQCB approval, the top 18 inches of soil will be removed and loaded into the excavation at the DeWenter/Jordan/Green property. Bioremediation treatment of the remaining lifts of soil will subsequently be initiated.

(2) As a general rule, supplemental nutrients such as nitrogen and phosphorus are added to soil to obtain a simple ratio of carbon:nitrogen:phosphorous of 100:10:1. However, there is a great deal of potential variability in this ratio due to environmental conditions including soil moisture levels and other empirical factors. Typically, optimal rates of bioremediation can be obtained with the ratio of carbon:nitrogen ranging anywhere from about 10:1 to 10:0.3.

The total volume of soil within the biotreatment cell is estimated to be about 7,000 cubic yards or about 20,000,000 lbs. The average concentration of TRPH at the start of bioremediation was about 1,000 ppm. Therefore, the total amount of TRPH to be remediated is about 20,000 lbs, most of which is carbon. Using the optimal carbon:nitrogen:ratios of 10:1 and 10:0.0.3, the calculated total requirement for nitrogen would range from 2,000 lbs to about 700 lbs. To date, about 1,600 lbs of nitrogen have been added to the biotreatment cell. Thus, based on general guidelines, the rate at which nitrogen is added during subsequent treatment periods may be reduced as long as measured nitrogen levels do not fall below adequate levels for bioremediation to be effective. Soil moisture must be maintained at adequate levels (10-15%) in order to utilize nitrogen efficiently. In an effort to maintain adequate levels during hot Summer months, the volume of water sprayed on each cell was increased from one day of watering to two days per week. Phosphorus levels are not as critical as nitrogen and appear to be within adequate range.

(3) Remove the top 18 inches of soil from Cell #2 and load soil into Santa Fe Spring Oil Well 732C and DeWenter/Jordan/Green excavations. Bioremediation of the remaining lift will be subsequently be initiated.

The attached figures, tables, and appendices complete this report. Should you have any questions, please contact Tabb W. Bubier at (714) 752-3204 or Hassan Amini at (714) 752-3208.

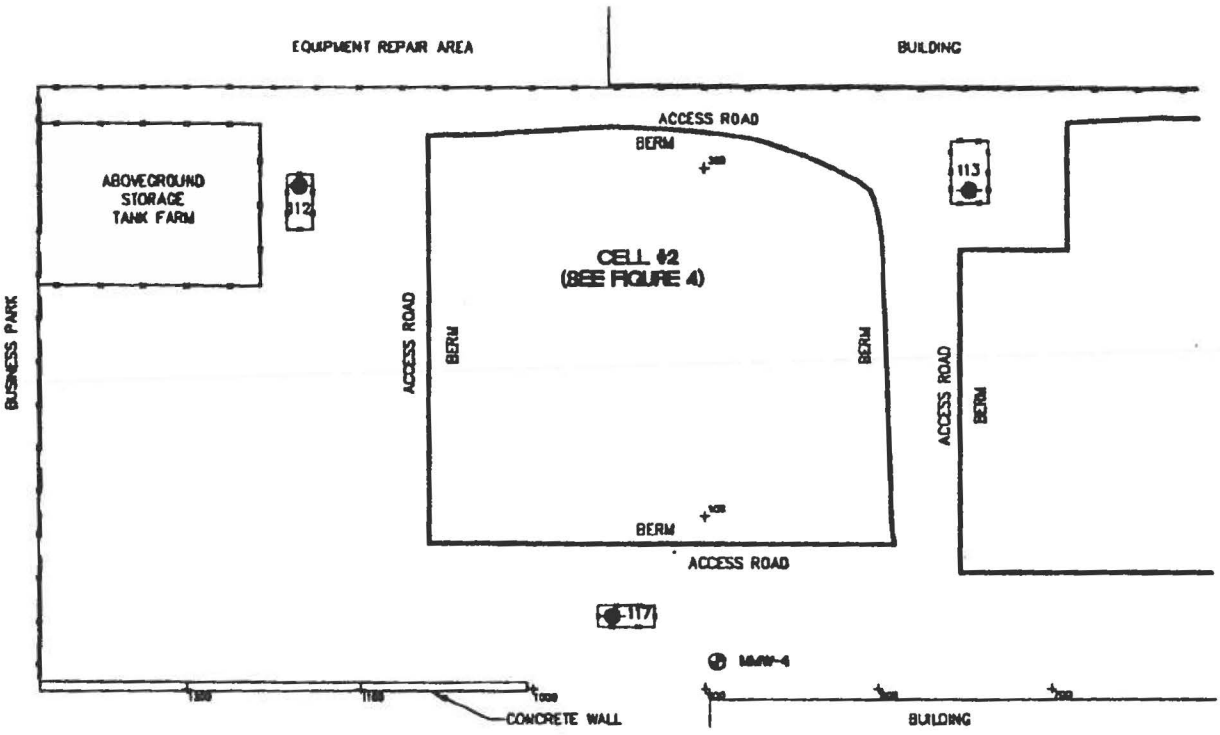
Sincerely,

Tabb W. Bubier
Supervising Geoscientist

Hassan Amini, Ph.D., R.G.
Principal Geoscientist

Enclosure

cc: T.M. Walker, Mobil Exploration and Producing
J. Hill, McLaren/Hart



LEGEND

- APPROXIMATE AREA OF BIOREMEDIATION CELL (4.37 ACRES)
- GROUNDWATER MONITOR WELL LOCATION
- NOTES: SITE MAP MODIFIED FROM LEVINE-FRICKE (1991c). AREA ESTIMATIONS CONCERNING ACTIVE OIL WELLS AND EXISTING TANK FARM ARE BASED ON VISUAL OBSERVATIONS FROM LEVINE-FRICKE (1991c).
- 117 OPERATIONAL OIL WELL
- SURVEYED MEASURED INTERVALS (100 FOOT)
- CHAIN LINK FENCE
- GATE